

# Markets and Gender Interaction in Climate Change Adaptation and Mitigation: A Case of the Coastal Kenya Sedentary Farm Households' Experiences

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## Abstract

Climate change is a global concern which manifests on a multilevel perspective and sometimes distinct or nested within some geographical boundaries. At the sedentary farm household systems climate change is real and continues to have impacts across different agro-ecological zones. A participatory rapid appraisal survey aimed at investigating the role of markets and gender participation in climate change adaptation and mitigation was conducted using key-informant interviews and gender-based group discussions in Kwale County of the coastal lowlands of Kenya. Results indicated that there has been an enormous and an elicited rapid reduction of vegetation cover by 50% in the last ten years, a 45-50% decline in cattle and 30% sheep and goat populations. The loss in vegetation cover and diversity, translated to a rapid increase in soil erosion mainly from wind and running water. Critical to farm sedentary households was the shift in the seasonal calendar characterized by erratic nature of rains in intensity and spatial distribution. Markets played a crucial role in factor-product mobility where some of the factors and/or products were drivers for technology marketing and adoption as a way of adapting to and mitigating climate change. Market forces were also instrumental in increasing the demand for energy thereby leading to increased vegetation harvesting for fuel wood and charcoal. Compared to the last 15 to 20 years, markets were major sources cereal-based food resources by over 80% as demonstrated by the movement of such resources from urban markets to the rural farm households other than the reverse. Markets also enhanced technology transfer and adoption by over 30% among households. There were however radical shifts in gender roles within households such as men sourcing for water in the event of severe or prolonged drought, women participation in the construction sector and increased social networks that with increased women participation in business. Ethnic based frameworks for gender roles were generally on decline following collapsing of cultural pillars which in the past dictated gender roles. The paper further outlines and suggests critical impacts of climate change across some identified vulnerable systems and makes policy recommendations to deal with the issues raised.

**Keywords:** Climate change, markets, gender, sedentary farm households, adaptation and mitigation

## 1.0 Introduction

In the past decades, the most known and practiced adaptation strategy to climate change (CC) has been migration to safer grounds or places (Leighton, et al 2011). This adaptation strategy has been practiced particularly where land size and ownership has not been a constraint (Brauw, et al 2011) and has encouraged nomadism (pure or trans-humance) of some degree depending on the land use systems. However, following shifts prolonged droughts, population growth, expanding crop agriculture and changing land ownership patterns as a socio-economic variable, households (including the most pastoral ones) have across time been forced to live under sedentary system which has its own ecological/environmental consequences (Ekaya, 2005). Still with the changing climatic condition, households have continued to be nested within their natural cultural set-ups which tie them to ethnic groupings which dictate or influence gender roles since "*ethnic identity*" refers to feelings toward, and a sense of belonging to which eventually influences experiences and social interactions including choices to do what in the community (Darling et al, 2006). The Coastal lowlands of Kenya are an equally affected region by CC and in the event of adaptation and mitigation, communities tend to interact at different levels but with most participation realized in the market place which plays a crucial role in mobilization of resources (both factors and commodity outputs). Hence, in the realization of the reality of CC and its effects, an effort was made to investigate community adaptation and mitigation strategies following CC, the role of markets

alongside the emerging gender issues in a climate change scenario peculiar to the region and particularly to sedentary households. The paper further investigates functional relationships of markets and the effects and impacts of climate change and compares the functional model that incorporates the role of markets and emerging gender issues with the conventional model presented by the IPCC, 2001b on mitigation and adaptation response to climate change in the absence of markets and gender variables. Shifts in gender roles were investigated as a strategy for optimizing the human resource at household level as well as for provision of entry points in enhancing household equity, productivity and identifying source/s of conflict which are all significant to CC adaptation and mitigation.

## **2.0 Materials and Methods**

### **2.1 The Study Area**

The study was conducted in some two agro-climatic niches in Kwale County of the coastal lowlands of Kenya namely Lunga-lunga/Vanga (niche one) and Taru/Kilibasi (niche two). Niche one is an area which lies within the coastal lowland (CL) zone 3-4 while niche two lies in CL 5-6. The niches are distinguished by long term (15-20 years) average annual precipitation regimes (in the range of 750-1,000 mm in niche one and 450-650 mm in niche two) as well as land use patterns where in niche one there were more arable activities of both annual and industrial crops and niche two had more of livestock keeping backed up by annual food crops which tended towards maize and pulses.

### **2.2 Methods of Data Collection and Analysis**

A Climate Vulnerability and Capacity Analysis (CVCA) methodology was used for the study. This methodology helps us to understand the implications of climate change for the lives and livelihoods of the people we serve. By combining local knowledge with scientific data, the process builds people's understanding about climate risks and adaptation strategies. It provides a framework for dialogue within communities, as well as between communities and other stakeholders (Daze' et al, 2009). The results provide a solid foundation for the identification of practical strategies to facilitate community-based adaptation to climate change. To make this methodology operational, a common ground was reached during a stakeholders' joint planning meeting which brought together crops, livestock and natural resources subject matter specialists where the actual sites for data collection were agreed on following a stratified systematic sampling where each niche was represented by two sub-locations or villages. Four villages (nested in four different sub-locations) were then identified as Magangani and Mikomani in niche one and Nyacha and Kilibasi in niche two from which one community group of the size of 20-35 people/participants were gathered and interviewed with the aid of a group discussions guiding checklist. The groups were all mixed with a male to female gender ratio of near one to one for the purpose of equality. The age bracket of the group participants was purposively stated to be in the averagely in the range 25-65 years during the invitation which was also met by 86% precision.

Data was gathered through a total of 4 group discussions conducted on a three-tier level that comprised interviewing one mixed group then followed by gender based grouping (male and female) for each site. For the purpose of estimating on participation by age, respondents were requested to register their attendance alongside indicating their estimated age in years. A total of 12 interviews of four (4) composite groups and 8 sub or gender based groups were accomplished. Key informants (agriculture (3), environment (2), livestock (3) and administrative composed of chiefs and village elders (6) staff) were separately interviewed in order to triangulate the responses from the group discussions. Data was then synthesized using a grid analysis method and results presented as below.

## **3.0 Results and Discussions**

### **3.1 Demographic structure of the respondent groups**

The group interviews brought together the views and perceptions of a total of 100 respondents (49 females and 51 males) together with 14 (4 females and 10 men) key informants drawn from different professions which have direct concern with CC issues. The gender disaggregation of the respondents is summarized in table 1 below.

Table 1: Gender participation of groups' participants/respondents ad key informants

Niche	Actual data collection site	Number of participants (N)	
		No. females (n1)	No. males (n2)
One	Lunga-lunga	19	14
	Mikomani	9	13
Two	Nyacha	14	11
	Kilibasi	7	13
Overall key informants' structure by profession:			
-Agriculture staff		1	2
-Livestock staff		0	3
-Environment staff		1	1
-Administrative staff		2	4

Source: Rapid appraisal data, 2013 (Danda, et al)

### 3.2 Climate Change in the Context of Sedentary Households in the Study Area (effects and impacts)

Stock taking of the effects of CC in the context of sedentary households ranked rapid reduction of vegetation cover (by 50%) in the last 10-15 years followed by a 45-50% decline in cattle population and 30% in the population of sheep and goats. The loss in vegetation cover and diversity had adverse effects over soil erosion which was also seen to increase at a rate above that of vegetation loss. The loss in vegetation was attributed to the co-existence between man and fauna/vegetation following the dependence set or the benefits that households derive from vegetation in the form of source of energy (charcoal or fuel-wood) or from harvesting vegetation as a way of opening up land for arable farming or for construction purposes. The critical concern in this area of vegetation-human co-existence is that there were/are no efforts to reclaim the harvested tree population or the rate of replacement is far much below that of harvesting. Ekaya, (2005) took stock of the effects of sedentarization as a reduction in vegetation cover, both herbaceous and woody (tree and shrub). The percent tree cover and density gradually increase with distance away from sedentarization point. In this particular study, woody vegetation was harvested for house construction, charcoal burning, fuel wood for sale and use at home. The depletion of vegetation is often concomitant with a near cessation of woody vegetation recruitment due to trampling and destruction of seedlings. The overall outcome, Ekaya (2005) asserts is frequent collection of dust balls from winds blowing across soils with hardly any vegetation cover. These dust balls in effect blew away the "fertile" top soil of the land thus reducing the recuperative capacity in terms of self re-vegetation.

In terms of arable agriculture and livestock production, the effects of CC were expressed on a three tier basis; shifts in seasons as demonstrated by shifts in the onset of rains, poor distribution of the rains both on intensity/rainfall days or spatial distribution and the time length of dry spells (prolonged droughts). Immediate reported effects of these rainfall and/or seasonal shifts as reported by the Famine Early Warning Systems Network (FEWSNET) were crop failures with seasonal crop success probabilities falling from 0.82 and 0.56 in niches one and two in the last 10-15 years to 0.58 and 0.24 respectively (FEWSNET, 2006). Lack of water for both livestock and human beings became a perpetual problem following drying of the water towers what used to be perennial water sources (rivers or lakes).

Adaptation and mitigation to CC based on experiences from this study took very narrow dimensions such as going for other options to vegetation harvesting such as embracing a "new" set of technologies for the study area such as use of animal driven implements/ploughs (ox-ploughing) and use of tractors as a way of maximizing on the short-lived trains and use of green houses for high value crops. Other adjustment strategies towards CC included protracted relief and recovery operation and food for assets.

### 3.3 Markets and Climate Change

Markets in the context of this study constitute institutions and/or places where the needs of the seller and the buyer are met. Under this conceptual definition, the emphasis was to follow Jorgenson, (2004) approach of investigating the effects and impact of CC on tradable goods that are relevant to livelihoods other than aspects of impacts of climate change such as changes in species distributions, reductions in biodiversity, or losses of ecosystem goods and services species. The significant lessons were that the traditional role of markets in the past (10 years and above) was that of providing an environment and a framework for exchange of goods and services which in this study included sale of agricultural produce mainly food-based, livestock that largely included cattle, sheep and goats. Other agro-based tradable commodities were roof-thatching material from coconut palm fronds, coconuts and vegetables of exotic origin such as kales, spinach and brinjals. In the past the study noted that there was a high inflow of cereal-based food resources (maize and sorghums) and pulses to the market than was the case during the time of the study where cereal-based food resources had changed direction by over 80% from urban markets to the rural farm households. Local vegetables such those belonging to the category of African Leafy Vegetables (ALVs) that comprise amaranth, black night-shade and spider weed were increasingly becoming available as tradable farm commodities which meant that their emerging economic role was being rejuvenated to mitigate CC effects at household level more than their nutritional role. This implied an

overreliance on markets as sources of food in the study area and therefore alluding to the importance of markets in the event of CC. Furthermore, the institutionalization of mobile markets across trading centres and time was another factor/driver that contributed to energizing the role of markets. Markets were also instrumental in accessing and domesticating technologies such as use of ox-ploughs and green houses through the mobile markets where farm implements that included ox-plough spare parts, drugs for veterinary and crop applications as well as providing information platforms for green house, irrigation and fertilizer use technologies. The impact of markets and in particular the mobile ones were estimated on community elicitation at a 30% increase in adoption of ox-ploughing technology, 35% in use of veterinary drugs away from traditional/alternative healing methods and up to 90% access to staple food (mainly maize, cowpeas, green grams and cassava).

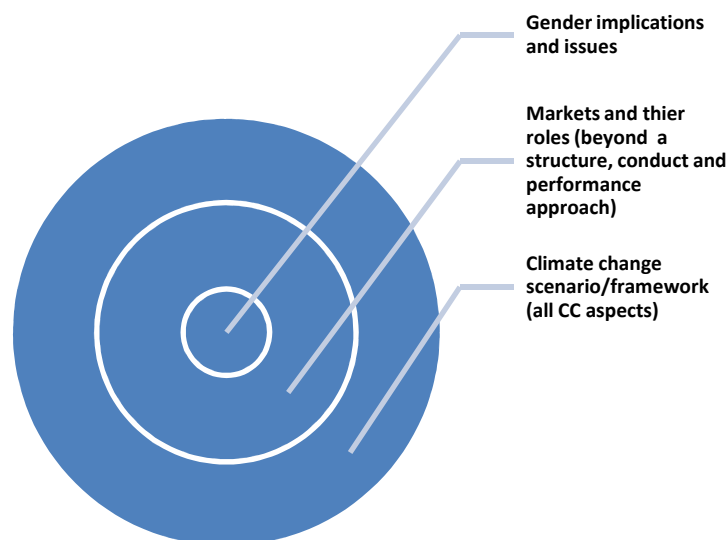


Figure1: A diagrammatic presentation of the functional relationships of CC, markets and gender  
 Source: appraisal and data triangulation output (2013)



Figure 2: Markets enhance factor input mobility and access



Figure 3



Figure 4

Figures 3 & 4: Markets create demand for charcoal and perpetuate access to uncertified and inferior seed (a negative impact)

### 3.4 Gender Issues in the Context of Climate Change

The concept of gender as nested in the African ethnicity perspective has been mentioned by Darling et al, (2006) and Parikh, (2008) presented a case which tried to evaluate whether CC truly qualifies to be a gender issue. He started by outlining insights that validate CC to be a gender issue based on the argument that women are particularly vulnerable to CC because they are more prone to the adverse impacts from it (CC). He further explains that their limited adaptive capacities arise from prevailing social inequalities and ascribed social and



economic roles that manifest itself in differences in property rights, access to information, lack of employment and unequal access to resources. This is scenario is in agreement with the status-quo situation where the state of liberalization of the African woman still remained controlled within the socio-cultural pillars of the African ethnicity framework which does not recognize of role social networking or group affiliations (Abdomaleky, 2012). The effects of CC on women has been attributed to decreased food security, greater impact on livelihoods due to increased dependence on natural resources which are most affected by CC, poor access to water resources and increased burden of care giving to the entire household (Parikh, 2008). However, emerging trends in the study area gave evidence that women and men made bold decisions to face the challenge of CC through a number of interventions. Below is a summary of gender-based interventions in the spirit of CC adaptation and mitigation, realized outcomes and a deliberate indication of being a shift from the past norm or otherwise.

Table 2: Gender based adaptation and mitigation strategies and outcomes

Activity addressing adaptation and mitigation objectives	Gender level/typology			Participation/shift outcomes and/or remarks
	Men	Women	Youth	
Increased affiliation to social networks/groups	0	1	0	-Active participation of women in group activities that target economic gains but threatened by household conflicts from the control of cash earnings
Diversification to casual off-farm income sources	1	1	1	Women now active in the construction sector
Charcoal burning	1	1	1	Formerly a masculine and men's work but an opportunity for women also
Collecting/ harvesting vegetation for fuel-wood	1	1	1	Men and youth (boys) now active to supplement household incomes and food security
Fending for and carrying water	1	1	1	Men now active in bringing water for the households which is a deviation from the norm. There was a significant increase in use of bicycles by men and women for carrying water
Herding livestock	1	1	1	Men have increased their participation to mitigate rising cases of livestock thefts

Legend: 0=No participation in the activity, 1=Full participation in the activity



Figure 5: Women in the costruction sector      Figure 6: Increased women participation in the market

#### 4.0 Conclusions

The effects and impacts of CC among sedentary households appear to be complex. For one, there was an emerging right to ownership and identity to land while at the second level there was the challenge of exposure to a vast natural resources set such as vegetation and sand that could be harvested for economic benefits with express freedom. In examining the role of the market and gender in a CC scenario, the study developed insights that were functional to making generalizations that markets were and will remain instrumental in catalyzing and/or mobilizing people and processes towards CC adaptation and mitigation. More particular were the roles that markets mobilized factors of production such providing a meeting point for the investment loving farmers and sellers of input factors such as seed (seed for various crop types and foundation stock for livestock) besides farm implements and/or veterinary drugs and a range of pesticides and herbicides. The demand for energy in form of charcoal and/or fuel-wood was/is one testimony that negates the positive role of markets as they remain functional in encouraging harvesting of vegetation with little r no replacement. On the other hand CC effects in the recent 2008/09 experience in Kenya demonstrated a severe market failure which translated into huge economic losses from livestock deaths as a first degree impact of prolonged drought, a situation which implied lack of long-term National adaptation and mitigation strategies which only invites coping strategies on emergency levels/dimensions. On gender issues, study reveals good lessons on the household economies against

the total money income and food material earnings as being meagre and therefore requiring supplementation which implies that everyone in the household needed to generate either cash income or food material irrespective of gender.

### 5.0 Recommendations

The role of markets as discussed is crucial in CC adaptation and mitigation. However, considering the recent experiences which have left many regions including the study area a food deficit area, the need for long-term strategies and policies which invite the full participation of markets against all tradable resources and sources of livelihoods need proper and timely redress. Sources of market failure that eventually distort the functionality of the forces of demand and supply need to be identified and corrected. On gender concerns, the pivot lies Governments and particularly the County Governments to embark on a continued linkage with the market environment and enabling instruments to ensure the following as suggested by Parikh, (2008) understanding and address gender-specific natural resource use patterns, recognizing that women are more vulnerable in climate change driven scenarios, identifying women's particular skills and capacities that lend themselves to mitigation and adaptation and increase women's participation in decision-making at all levels in climate change mitigation and adaptation. Development of cross-cutting policies that minimize the effects and impacts of CC as well as promotion of an all inclusive participation in CC mitigation plan will go a long way in reducing the impacts of CC through increasing community resilience. The need for enhanced research to identify causes of market failure in CC scenarios as well as engaging communities in understanding and enhancing their capacities to adapt and/or mitigate climate change needs a first degree attention rather than ad-hoc coping strategies which turn to be costly in the long-run.

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